



BEDROCK ALMANAC — Dr. John C. Brandt, head of Goddard Space Flight Center's Laboratory for Solar Physics and Astrophysics, points to an ancient American Indian petroglyph which he believes represents sightings of the supernova which created the Crab Nebula in 1054 AD. Located near the Village of the Great Kivas near Zuni in western New Mexico, the petroglyph depicts the supernova as a cross near a crescent moon. Unless protected within tribal boundaries or in national parks, Indian petroglyphs are rapidly being pilfered to end up as coffee table tops and conversation pieces in dens and gamerooms.

Five From JSC Get ESMs At Headquarters Ceremony

Five JSC employees November 11 received NASA Exceptional Service Medals in ceremonies at NASA Headquarters in Washington. ESM recipients were:

Equal Opportunity Programs Office Chief Joseph D. Atkinson, Jr. for "outstanding leadership in directing JSC's Equal Opportunity Program ... resolving discrimination complaints, recruiting minority and

female employees, and informing employees of equal opportunity progress."

Management Services Division Chief Donald R. Blume for "outstanding managerial leadership of support services at JSC and for accomplishments in using technological advances and efficient management of resources to achieve increased productivity."

Mission Reporting Branch Chief Joe W. Dodson for "outstanding contributions to the design, development and testing of spacecraft ... and for exceptional leadership and skill in preparation of high-quality mission documentation."

Earth Resources Laboratory Director D. Wayne Mooneyhan for "outstanding achievements in development and application of remote sensing technology ... and effectively demonstrating the value of space technology to man's increasing needs for environmental and natural resource management."

Space Shuttle Resources and Schedules Integration Manager R. Wayne Young for "outstanding managerial leadership in planning and directing program resources and schedule integration and contract management for the Space Shuttle Program."

FTS Drops Area Codes

More than a million telephones will be affected December 1 when the General Services Administration converts the Federal Telecommunications System (FTS) from a ten-digit to a seven-digit dialing system.

Part of a GSA program to modernize the FTS, users will no longer dial the area code after the access number (JSC 87) but will simply dial the seven-digit number for calls made within the system to other government telephones. Many FTS users outside Washington, D.C. will get new FTS numbers, and the 1976 FTS User's Guide is scheduled to be distributed by the end of November. The next JSC directory will also carry new FTS numbers.

JSC's prefix will not change for local incoming calls or commercial toll calls. The prefix will, however, be changed from 483- to 525- for calls made to the center on FTS from other federal locations. Again, area codes will not be used on FTS.

Misdialing on FTS after December 1 will get a recorded message referring callers to a Houston number for correct dialing instructions, but JSC Communications Services Branch chief Theodore C. Paulos suggests that employees having FTS dialing problems call the JSC information operator at 3111 for assistance.

ROUNDUP

NASA LYNDON B. JOHNSON SPACE CENTER

HOUSTON, TEXAS



VOL. 14 NO. 23

Friday November 21, 1975

Indian Student Participation In JSC Programs Discussed

Educational and cultural aspects of the American Indian are new to JSC, but not to the University of Oklahoma College of Engineering. Although Oklahoma has the largest Indian population of any state, American Indian students have been recruited into engineering from other states.

The University's Indian recruitment and retention program arises from the fact that in 1973 only 382 American Indians were enrolled as engineering undergraduates and only 46 received BS degrees in engineering. Only three percent of the Indian students who enter college ever graduate, compared to a national average of 32 percent. The

disproportion is largely due to economics and cultural differences.

George Thomas, director of American Indian Programs at the College of Engineering, believes that increased Indian engineering careers are important in the future management of tribal lands and resources, where a knowledge of Indian lifestyle is needed along with engineering expertise.

Thomas visited JSC November 10 to discuss possible Indian engineering student participation in JSC's summer intern and co-op training programs.

ASTP Groups Write Report

Working groups from the US and the Soviet Union meeting at JSC today will wrap up their two week session for writing the final joint report on July's Apollo-Soyuz Test Project mission.

Prof. Konstantin D. Bushuyev, USSR mission technical director, headed the 25-member delegation from the Soviet Union which arrived at JSC November 10. USSR lead flight director Cosmonaut Aleksey S. Yeliseyev was also a member of the Soviet delegation.

US Technical Director Glynn S. Lunney headed the NASA working group.

U of H Offers Future Studies Spring Course

"Limits to Growth," a question recently debated in a conference at the Woodlands and recognized as one of the most important issues of our time, is examined on a daily basis at the University of Houston at Clear Lake in a distinctive graduate program entitled "Studies of the Future".

During the forthcoming 1976 Spring Semester, the university will offer 14 courses in future studies ranging from astronomy to health care. Among the course titles are Science Fiction in Literature and Film, Ecology and Public Policy, Black Holes and Space Probes, Moral Issues in the Future of Science, Man's Future in Space, Resources in the Future, and Environmental Impact Statements.

For information regarding future studies, contact Dr. Jib Fowles, Chairman, Studies of the Future, 488-7170, extension 250.



FIRST AMERICANS — Representatives of the JSC Equal Opportunity Office and the University of Oklahoma College of Engineering met with JSC Director Christopher C. Kraft, Jr. November 10 to discuss possibilities of American Indian engineering student participation in JSC's summer intern and co-op training programs. Left to right are: Leo Villareal of JSC Equal Opportunity Programs Office; George Thomas, Cherokee, director of the University's college of Engineering American Indian Programs; Jerry Elliott, Osage, of the JSC Space Shuttle Program Office; Joe Atkinson, Chief of the JSC Equal Opportunity Programs Office; and Kraft.

Viking Passes Systems Check On Mars Trip

Jet Propulsion Laboratory engineers last week checked out Viking 1's systems and reported that the spacecraft was in excellent condition on its Mars voyage.

Viking 1 was launched August 20 and is now more than 17 million miles from Earth. The Lander portion of Viking is scheduled to touch down on Mars in early July 1976.

The JPL checkout included the Viking's power, propulsion, guidance, attitude control, computer, tape recorder, telemetry and radar landing systems. Four Lander instruments, including the two cameras for photographing the Martian surface, were also checked out.

Viking 2 was launched September 9, and was scheduled to undergo a similar checkout this week. The second Viking Lander will touch down on Mars about September 9. The spacecraft is now almost 14 million miles out from Earth.

The Vikings will conduct a detailed scientific examination of Mars, including a search for life.

Press Sees Orbiter

An Orbiter 101 progress review for newsmen Wednesday was held at Rockwell International Corporation's Palmdale, Calif. plant where Orbiter 101 is in final assembly.

JSC Space Shuttle managers and RI Space Division took part in the briefing and photo session. Orbiter 101 has had the wings and orbital tail mated to the mid-fuselage.

NASA, ERDA Collaborate On Solar Heating/Cooling

Business and industry are being asked to join government agencies in an all-out effort to develop solar energy heating and cooling systems.

Industrial firms have been asked by NASA's Marshall Space Flight Center, Huntsville, Ala., and the Energy Research and Development Administration (ERDA) to submit proposals for development of systems and subsystems for both residential and commercial buildings applications.

ERDA has assigned Marshall responsibility for development of solar heating and cooling systems in support of ERDA's program for national solar energy research, development and demonstration. The goal of this program is to stimulate the creation of a viable industrial and commercial capability to produce and distribute solar heating and cooling systems.

ERDA is responsible for management and coordination of the national program under the Solar Heating and Cooling Demonstration Act of 1974, which requires demonstration of the practical use of solar heating in various regions of the United States within three years and of combined solar heating and cooling within five years.

Requests for Proposals (RFPs) have been issued by Marshall for five areas of procurement. The first one is directed to firms which are already producing and marketing solar heating and cooling subsystems. From the proposals received, several firms will be selected for procurement contracts for these subsystems, which will be tested, evaluated and integrated into complete systems.

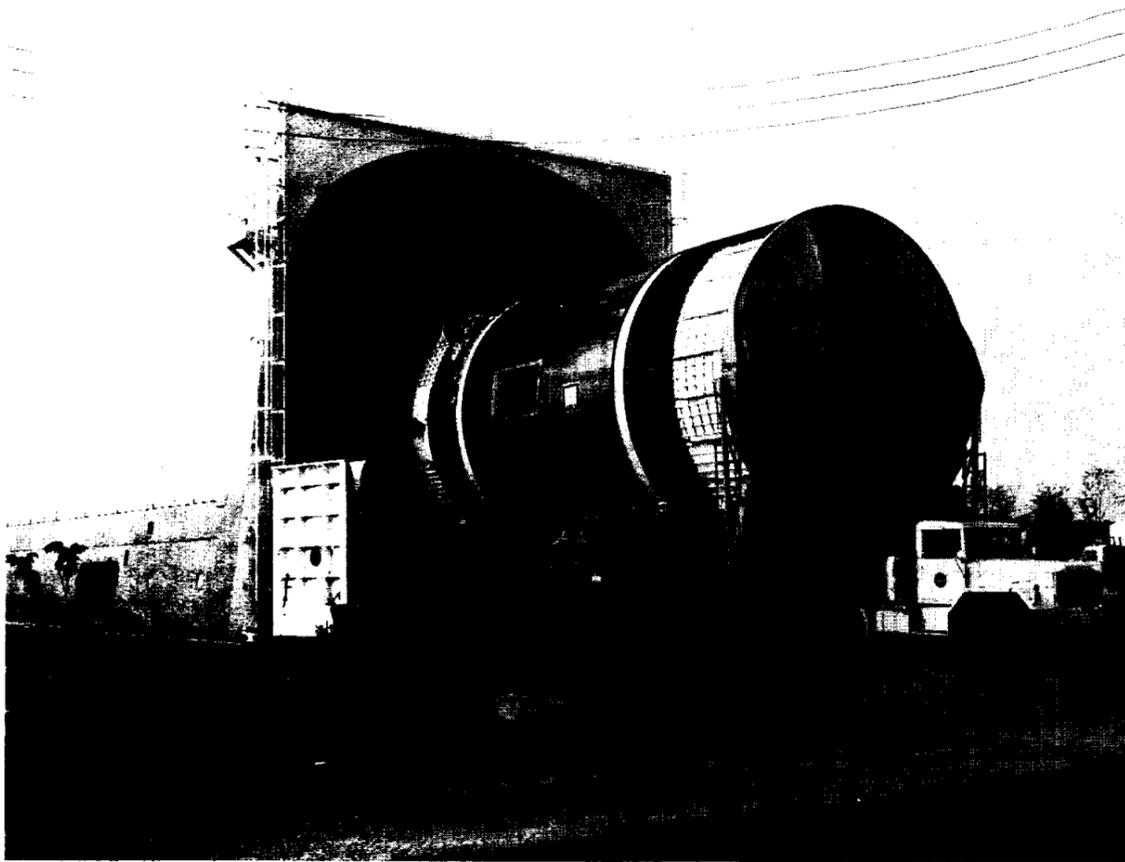
The second RFP asks for proposals from firms now in the process of developing marketable subsystems and offers government assistance in their development. Multiple contracts are planned under this RFP with further subsystem improvement testing, evaluation and integration.

The third RFP, under which multiple contracts are also planned, asks for proposals from firms with complete solar energy heating and cooling systems under development and offers government assistance in developing the systems into marketable products.

Two or more contracts are planned under a fourth RFP which calls for design and development of innovative complete solar heating and cooling systems.

Under the fifth RFP, a single firm will be selected for a contract to test and evaluate the subsystems procured under the first two RFPs mentioned above. After testing and evaluation, the selected firm will integrate the subsystems into marketable systems.

The first three RFPs are aimed at small business participation and goal of 50 percent awards to small business has been established for these solicitations.



MUSEUM PIECE — The backup flight article Skylab Workshop is eased aboard the NASA barge *Orion* at Marshall Space Flight Center for a month-long voyage down the Tennessee, Ohio and Mississippi Rivers and along the Gulf and Atlantic coasts to become a permanent exhibit at the Smithsonian Institution's National Air and Space Museum in Washington. The Museum will open July 4, 1976.

Final Minority Technology Seminar Held

The sixth and final session in a series of technology transfer seminars for the benefit of minority businesses was held November 18 in Atlanta.

Sponsored by NASA and the Department of Commerce's Office of Minority Business Enterprise (OMBE), the seminars seek to share space-age technology with minority businesses to assist them in developing new products for commercial markets.

Earlier technology transfer seminars were held in Houston, Los Angeles, Boston, San Francisco and Chicago.

The purpose of the seminar series is:

- To provide relevant technology transfer information to manufacturers and service companies and to illustrate how such technology may be obtained and adapted for use by the business community.

- To provide access to NASA's technology utilization facilities as a source of commercial market development.

James Dixon, NASA's Minority Business Specialist in the Office of Equal Opportunity Programs, emphasized that the seminars will mean the most to minority business firms that have achieved some degree of success in technical and manufacturing enterprises.

"We feel that only those minority firms that have already developed some degree of expertise in their fields will actually be able to benefit from this program," Dixon said.

"There are a number of minority firms in Atlanta and neighboring areas that have a real potential for development of commercial products from the technology that will be shown at the seminar," Ray Gilbert of NASA's Office of Tech-

nology Utilization said. "We hope many of them will have their representatives at these meetings."

Gilbert noted that an on-site computer terminal at the conference was used to demonstrate how technical information can be obtained from NASA's interlocking system of data bank locations. Industry representatives were invited to test such information retrieval without charge during the demonstrations.

The seminar format served to introduce businessmen to information and services available through NASA's data banks, which can be called on to solve a variety of business problems that confront small businesses.

Under terms of the agreement between NASA and the Office of Minority Business Enterprise, the space agency will provide elements of technology, along with information on patent applications and information about possible customers for any newly developed commercial products. OMBE, through its network of minority business assistance operations, will provide information and assistance in such areas as possible sources of funding and development of loan packaging.

In reviewing the effects of the seminar project, Gilbert said the Office of Technology Utilization estimated they will have reached almost 100 minority business persons during the project, and will have conducted about 100 computer searches.

He emphasized that the program was not designed merely to attract large numbers of persons desiring to enter the business field. Rather, it attempts to zero in on minority firms that could take advantage of the unique technology offered.



Equal Opportunity is good business!

ROUNDUP



NASA LYNDON B. JOHNSON SPACE CENTER

HOUSTON, TEXAS

The Roundup is an official publication of the National Aeronautics and Space Administration Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for JSC employees.

Editor: Terry White

Photographer: A. "Pat" Patnesky

Declare financial independence.



Buy U.S. Savings Bonds

it's no BULL!

COST REDUCTION IS AN UTTER MUST



Send your Cost Reduction Reports to:
BH4 - COST REDUCTION OFFICE

Children's Christmas Party Tickets on Sale Dec. 8

Tickets for the JSC Children's Christmas Party will go on sale December 8 in the Bldg 11 Cafeteria. Only 500 tickets will be sold and none will be sold at the door on the day of the party. The price is \$1.50 per child.

The Party will be held in the JSC Auditorium from 1 to 3 p.m.

December 20, and each child will be photographed sitting on Santa's lap.



CAMPAIGNER — Margaret Lucas of the JSC Contract Administration Office — Downey recently received the Los Angeles Combined Federal Campaign award for her leadership in exceeding the JSC Downey Resident Office goal. JSC Director Christopher C. Kraft made the presentation at Downey.

Vets' Day Tennis Standings Listed

Final standings in the JSC Veteran's Day Tennis Club Tournament, listed first, second and consolation, were: Women's advanced — Evelyn Carter, Ruth Damoff and Ann Williams. Men's advanced — Gid Weber, Jeff Lacy and Bob Purnell.

Women's intermediate — Mary Lacy, Kathy Harlan and Donna Hasler. Men's intermediate — Mark Brady, Dave Scheffman and Hank Schreiber.

Men's novice — Ken Thrasher and Larry Hirsh.



EAA Attractions

TICKETS AVAILABLE

On sale in Bldg 11 Exchange Store 10 a.m. to 2 p.m., no refunds: Astroworld-adults, \$5, children \$4 (regular \$6.50 and \$5.50); ABC Interstate Theaters \$1.50; free Disney Magic Kingdom cards, Six Flags Over Texas Funseekers cards and Lion Country Safari cards.

Dinner theaters: Windmill Dinner Theater *No Hard Feelings* starring Richard Egan \$14/couple (regular \$22) Nov. 11-30, not valid Fri. or Sat.; Dean Goss Dinner Theater has John Bouess comedy *The Loud Red Patrick*, \$16/couple (regular \$22) thru Jan 14, not valid Sat.

Sea Arama: adults \$3.25, children \$2.25 on sale.

Plays: *Don't Bother Me, I Can't Cope*, Houston Music Hall, Nov. 28, 8 p.m. Only ten tickets at half price (\$3.98) available through Nov. 26 at 3 p.m. in Rm. 657 Bldg 1.



DEFENSIVE DRIVING COURSE

The EAA recently arranged for the National Safety Council's Defensive Course to be offered to JSC employees, and about 250 took advantage of the offering. Defensive

driving is defined as "driving so as to prevent accidents in spite of the actions of others or the presence of adverse conditions."

A survey of defensive driving graduates shows that the group had 30 percent fewer accidents during the year after the course than during the year before the course. Additionally, Texas grants a 10-percent reduction in auto insurance rates (except fire, theft) to persons completing the course.

It is believed that all JSC employees should take the course and that many more will when they are made aware of its benefits. The course will be offered again in January, with registration Jan. 6 and 7 in the Recreation Center Lobby 7:30-9 a.m., 10:30 a.m.-1 p.m. and 4-6 p.m. Classes will be Jan. 12, 13, 14, 15, 19, 20, 21 and 22. Classes run four hours on two nights: Mon/Wed or Tues/Thur from 6 to 10 p.m. The fee is \$8/person.

ONE INCH EQUALS THREE BARLEYCORNS?

Do you know: that early records defined an inch as the length of "three barleycorns, round and dry" laid together; or that a pennyweight was equal to 32 wheatcorns from "the midst of the ear", or that John Quincy Adams in 1821 published a report seriously considering the metric system, but recommended

against it; or that a bill was passed in the House in 1899 to convert to the metric system but was sent to committee for reconsideration, where it died; or that the United States was the last major nation in the World to commit to conversion to the metric system?

These are just a few of the interesting and enlightening facts in *A Metric America*, one of the many Government publications available at the JSC Exchange Store. Price is \$2.25.

Why not drop by and see what's available. Some of the space-related books are no longer in print and will not be available when current stocks are sold.

HP21 PRICE CUT

The price of the HP21 Pocket Scientific Calculator has been cut from \$108 to \$88 at the Bldg 11 Exchange Store. Order now for Christmas gifts; deliveries will become slower during the next month.

CHEMICAL LIGHTS

The JSC Exchange Store in Bldg. 11 will take orders starting Monday for chemical light sticks. The light is produced by the reaction of two chemicals sealed in a plastic tube. There is no heat involved, and if the tube is broken the chemicals are non-toxic — either by swallowing or by skin contact, and are not eye irritants.

The sticks give useful working light for approximately three hours after activation and can serve as markers for another five to seven hours. They are ideal for emergency lights in autos, boats, camping or power failure at home.

A package of three sells for \$3.87. Sales will end December 5 and lights may be picked up on December 12.

EAA ATHLETICS

An EAA basketball season will begin January 5 and run for seven weeks. League registration at the Recreation Center will be December 8-12 and the entry fee will be \$75.

Concurrent with basketball will be a recreational ladies volleyball league Monday nights. Registration deadline is December 19.

EAA athletics programs for 1976 are listed below. Registration will begin two weeks prior to each activity. Leagues marked * will be subsidized by EAA as funds are available.

*Mens basketball	Jan 5-Feb 20
Ladies Volleyball	Jan 5-Feb 20
Mens basketball	Feb 23-Apr 9
*Mixed recreational volleyball	Feb 23-Apr 9
*Mens and ladies softball	Apr 12-Jun 9
Mixed competitive volleyball	Apr 12-June 4
Mens basketball	June 7-Jul 30
*Mens and ladies softball	June 14-Aug 12
*Mens and ladies volleyball	Aug 2-Sep 17
Mens and ladies softball	Aug 16-Oct 15
*Mixed competitive volleyball	Sep 20-Oct 29
*Mens basketball	Nov 1-Dec 9

Hq Travel Club 1976 Trips Open To All NASA

The NASA Headquarters Travel Club has completed plans for next year's foreign travel. The trips are available to all NASA employees — and in some case, to friends.



The trips are: Soviet Union-Moscow, Kalinin and Leningrad, March 22-30; Orient and South Pacific-Manila, Bali, Hong Kong, August 5-19; and Europe-London, Amsterdam, Paris, October 18-November 1.

For further information and reservations, write to Universal Travel (NASA Hq 1976 Travel Program), 1825 Connecticut Avenue NW, Washington, D.C. 20009.

Karate Club Holds Belt Rank Test

The JSC Karate Club held a rank promotion test October 30 which resulted in the following advanced-level rankings: Yellow Belt, 1st level — Connie Riley, Mike Vesper, Louis DeLuca and Tom Harmon; Yellow Belt, 2nd level — G. Dickey Arndt and Mike Hollars; Green Belt, 2nd level — Dave Lindsay; Blue Belt, 1st level — William Bates; Blue Belt, 2nd level — Ralph Culbertson and Jim Martens.

The EAA-sanctioned JSC Karate Club meets regularly at the Gilruth Recreation Center in two separate groups: Beginners' Tae Kwon Do Karate, Mon/Wed 5:30-7 p.m., and Beginners' and advanced Choy Lay Fut Kung Fu, Tues/Thur 5:30-7 p.m.

The advanced group is directed by Tony Wu. More information may be had from Club president Lynn York at 3821 or vice-president William Bates at 6191.

Roundup Swap-Shop

Swap Shop advertising is available to JSC and on-site contractor personnel. Articles or services must be offered as advertised, without regard to race, religion, sex or national origin. Ads should be 20 words or less, including home telephone number. Name and office code must accompany, but need not be included in ad copy. Typed or printed copy must be received (AP3 Attn: Roundup) by Thursday of the week before publication.

BOATS

Lightning sailboat parts: mast, boom, rigging, two mains, jib, spinnaker, centerboard, \$275 for all or negotiate for parts. 481-4196.

VEHICLES

74 Dodge Custom van, 16,000 miles, chocolate brown shag interior, many options, immaculate, \$4900 firm. 488-5037.

70 Dodge Challenger special edition, air, power, good cond, \$1275. Ford, 333-2156.

76 Cordoba, 360 eng, pwr steer/brks, stereo, many extras, burgundy/white vinyl roof. Ellis, 686-1923.

71 Cutlass 2-dr, auto, pwr steer/brks/R&H, new WSWS, 22,000 miles xcint, avail Nov 24, \$2200. 333-2395.

75 Caprice, air, pwr, AM/FM, cruise, radials, 17 mpg @ 60, Ziebart, reg maint, white/sandstone cloth, sell acc divorce, \$4500. 483-4097.

74 Chevelle Malibu Classic, air, auto, pwr steer, radio, xcint cond, \$3500. Booth, 482-7919.

73 Yamaha TX500, 5360 miles, xcint cond, \$950. Booth, 482-7919.

75 Camaro, bronze w/vinyl top, FM stereo, air, \$500 and pick up \$141/mo pmts. Green, 332-2861.

75 Camaro, red w/white vinyl top, AM/FM stereo tape, auto, air, pwr steer/brks, tilt wheel, sport mirrors, low miles \$4500. Cornett, 482-3603.

71 Capri, silver, sunroof, AM/FM, tape, stereo, manual, good cond, 2-liter eng, \$1500. Huss, 488-6310.

74 Buick Century Gran Sport, brown, vinyl top, ale, auto, AM/FM stereo, 350 V8, good cond, \$3975. Huss, 488-6310.

75 Kawasaki Z1900, low miles, \$2000. McKee, Baytown 424-7927.

69 Mustang, 302 V8, auto, air, \$1375. Baker, 472-0996.

69 Nova 6-cyl, auto, air, \$975. Baker, 472-0996.

26-in small frame Raleigh boys bike, \$40; 26-in one-spd girls bike w/hndbrks, \$20. 334-2180.

69 VW Squareback, AM/FM, air, good cond. 488-5017 after 5.

66 Chevy 3/4-ton pickup w/10-ft cabover camper, road air, Monomatic toilet, water htr, \$1895. 332-3674.

72 Chrysler Newport Royal, pwr steer/brks, air, auto, AM, vinyl top, \$1650. 471-4539.

73 Datsun 240-Z, orange w/blk int, like new, \$4995. 946-6133.

72 Chevy pickup, 350 hp, air, pwr, 51,000 miles, \$1600. Behrend, 331-3976.

PETS

Fawn Boxer at stud, Ch Morleen's Apache Ambush, an Ambush son. Bailey, 337-2855.

PROPERTY & RENTALS

Decorator-furnished 4-3-2 on Dickinson Bayou near Freeway, built-ins, fireplace, intercom, storage sheds, dog run, reduced — owner transferring. Barger, 534-4986.

One acre heavily-wooded land, Meadowcreek village-Houston, last undevel land in area, \$30,000 or will divide. 643-9841 after 6.

2-acre lot in Eldorado subdiv Friendswood, \$7500. Zupp, 482-7156.

Lake Livingston rental resort/retirement home, 3-2-1, attrac furn, Cape Royal area, wkly, monthly and yrly rates. 488-4487.

HOUSEHOLD ARTICLES

Regina floor polisher/scrubber, \$10; carpet sweeper, \$5; ironing board, \$5; white twin bed sheets, \$1.50/ea. Huss, 488-6310.

Boys oak bdrm set, bunk beds w/mattresses, dresser, mirror, \$190; contemp beige/brown/white Herculon sofa, \$150; tradnl cane wing-back chair, orng/grn uphol, \$85; oak Firewood, \$60/cord; GE Americana water/ice dispenser, harvest gold, \$850; small wetsuit, jacket/pants, 1/4-in thick, used once, \$40; white rabbit fur cape, \$35. Hernandez, 482-6379.

MISCELLANEOUS

Prof-qual Stingerland drums, incl bass, floortom, wingtom, snare, stands, seat, plus three Zilgjian cymbals, hi-hat, sizzler, 16-in bong, \$595. Schell, 488-0943.

Honda CL-100 parts — front end, frame, some eng, etc. 482-3100 after 5.

B&H XL-672 movie camera, still in box, \$150 or trade for equal val CB unit. 482-3100 after 5.

Ampex Micro 95 Cassette rcdtr/plyr, stereo, plays 6-stak, like new, \$90; 30 asst cassette albums, \$3/ea. 482-3100 after 5.

DeJur dual-8 movie proj, std or super 8, xint, \$30. 488-3966.

12-in Zenith B&W TV, ideal for camping or spare room, \$30. 534-2066.

Minox B camera, make offer. Poindexter, 474-2203.

Royce 620 CB, new base, super Penetrator ant w/coax and pole, \$250. 472-3244 after 6.

6-ft Sears Holiday pool table, one yr old, balls, triangle, two cues, \$45. Biggs, 471-2745 after 5.

Sears' best triple-action exercise bike, like new, cost \$85, sell \$35. York, 483-2074.

Trade Honda CB-350 Hooker exhaust for stock mufflers. Hydrick, 483-5361.

Football tickets: UofH vs Fla State Nov 22; vs. Tulsa Nov 29, two xcint seats, rsvd prkng, \$12. Behrend, 483-2961.

Four used G78x15 tires w/wheels, best offer. Mike, 332-5688.

Instrument flying, ground school. Musgrave, 483-2424.

Home stereo cassette tape plyr/rcdr. Texas City 945-3094 after 4.

Complete set tools/equip for watch-making and jewelry repair; cleaning machine, staking tool, lathe, polishing motor, cabinets of crowns, stems and staffs; many attachments and bench. 488-4005 after 5.

WANTED

American Flyer S-ga elec trains and accessories, 334-3182.

Portable cassette tape recorder. Billie, 483-6233.

Five-string banjo. 331-5067.

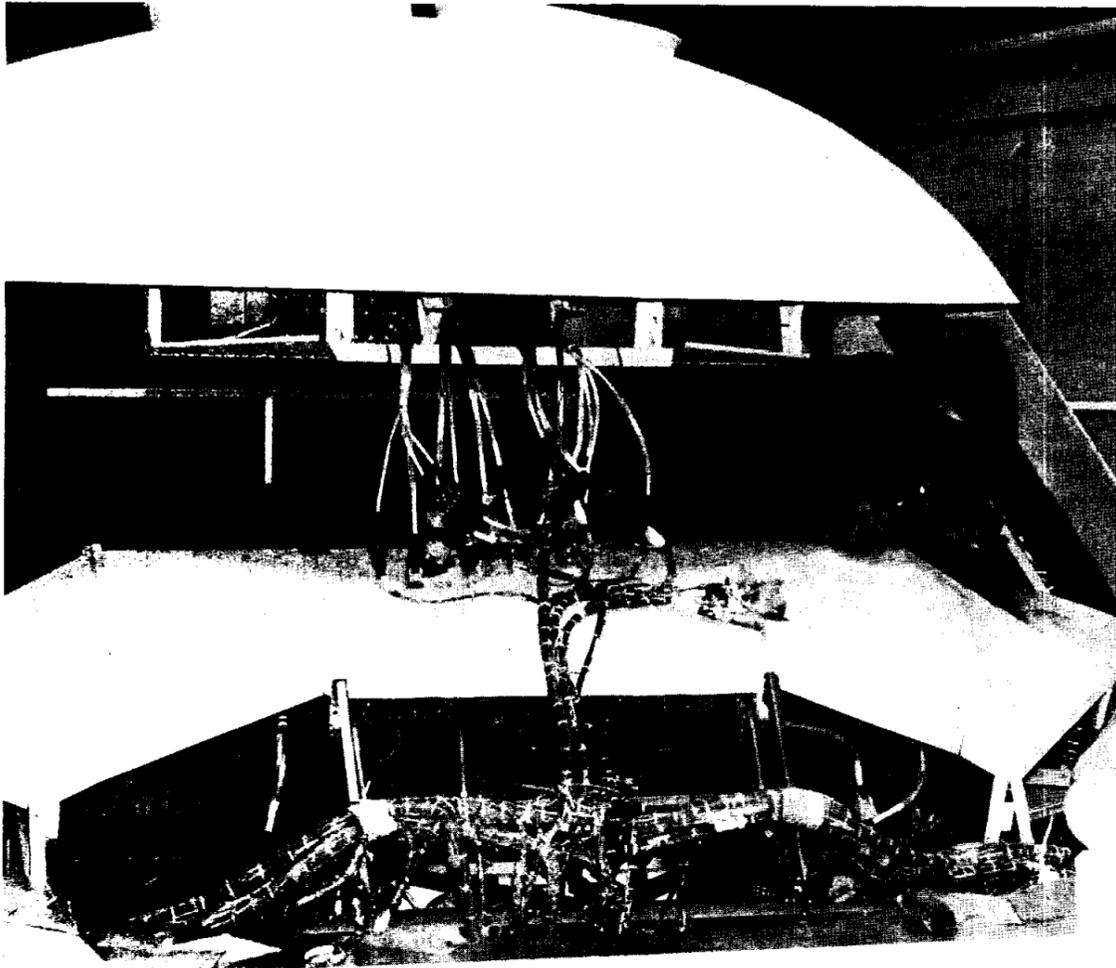
Toyota, Datsun or Luv pickup truck, prefer 73 or 74 w/air, radio, long body, camper top. 334-2449 after 7.

LOST & FOUND

Found: small locket and chain, owner may reclaim by describing. Spivey, x5028.

Found: pocket calculator Nov. 13, owner describe to Tipping at 4154 or 488-5510, x300.

It'll never fly!



Engineers and technicians in the Avionics Systems Engineering Division are putting the finishing touches on more than 250 miles of wiring and associated systems which comprise the Shuttle Avionics Integration Laboratory (SAIL), the newest and most complex integrated test facility designed to verify and test the electronic systems of the Shuttle.

which will have the Orbiter released from atop a 747-four engine jet aircraft and landing at the NASA Flight Research Center at Edwards, California.

Phase three is lab support to the initial orbital flight tests and the fourth phase is real-time support to Shuttle operational missions. Each phase of SAIL serves as a building block for the next until a final mission operations support status is achieved.

Although SAIL will never fly, it will test and verify that all electrical and electronic systems and the pre-programmed software (computer program) will perform successfully in all modes of operations. When operational, all avionics systems of the Shuttle — orbiter displays, controls, guidance and navigation systems, data processing, operational flight instrumentation, and the communications and tracking systems and including the main engines, the solid rocket boosters external tank controls and instrumentation, will be integrated and tested in the SAIL.

All avionic systems and associated harnesses are flight qualified or near flight configuration in all respects and are dimensionally and spatially located identical to the flight vehicle complete with a high-fidelity cockpit.

Control of the tests will be through the Test Operation Center (TOC) which consists of display and control consoles and hardware configured in to provide control of the SAIL including communication and direction of activities. A six-degree-of-freedom dynamic simulator will provide computers, interface equipment and visual displays including out of the window scenes for various operations such as approach and landing, docking, etc.

One hundred and twenty wire harnesses snake through the width and length of the SAIL facility. A total of 35,500 separate wire segments, 36 display and control panel assemblies, and 12 Line Replaceable Units (electronic boxes) have already been installed in the Building 16 facility. Upon completion the LRU's will number 128.

This past week engineers and technicians began powering up the various systems as part of the functional checkout of the equipment. Laboratory activation test should be completed by December and at that time, laboratory testing in support of the approach and landing flight test should be well under way.

SAIL may never fly, but it will provide testing and certification needed before the Space Shuttle can make its first orbital flight late in 1980. SAIL (Shuttle Avionics and Integration Laboratory) last week underwent initial systems tests in Bldg 16 as work nears completion on more than 250 miles of wiring, hardware components and systems for NASA's newest and most complex integrated test facility. Rockwell International engineer David Peterson, above, traces circuitry in the Orbiter crew compartment, while a fellow RI engineer at left checks out cable harnesses in the Orbiter forward avionics bay. In photo below, Carl Watkins of JSC Avionics Systems Engineering Division observes Peterson as he concentrates on assuring that the right wire goes to the right place.

